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# A CONTRIBUTION TO THE GEOGRAPHY OF ALBANIA

By ERNEST NOWACK

This contribution to our knowledge of Albania is made as a result of my researches during the war when I was engaged in geological reconnaissance in that country. The prosecution of my duties took me by ways on which few explorers had previously set foot and afforded unusual opportunity for observations on the Albanian himself as well as on his land. For the most part these travels were confined to central Albania, that is the region between the Mati and Semeni Rivers, and to southern Albania north of the Voyusa. It is this part of the country that is dealt with here. On a physiographic basis I divide it into Lower Albania, the Malakstra, and Inner Albania; and I shall treat first of physical and then of human aspects of what is the most densely settled and economically valuable part of Albania.<sup>1</sup>

## Lower Albania

The term "Lower Albania" designates a strip of land between the coast and the Inner Albanian mountains from the Mati River southwards, in which direction it gradually broadens. It is occupied by hills and low mountains with intercalated plains. South of the Semeni the typical landscape of Lower Albania gives way to a region of higher relief passing into the mountain ranges of Epirus.

## GEOLOGICAL STRUCTURE

The whole of Lower Albania is built up of Tertiary material, all stages from Eocene to Pliocene (the latter often with gradual change to the Pleistocene) being developed. The chief rocks are slightly consolidated sandstones and conglomerates, and clays and marls of marine and brackish origin. Especially common is the flysch which here is characterized by the regular alternation of thin bands of sandstone with indurated marl and clay.

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<sup>1</sup> This paper does not profess to be a rounded geographical description but is a survey of the writer's own observations so far as they are of geographical interest. Only occasionally is reference made to the observations of others. Such references include the following:

Relazione della Commissione per lo studio dell' Albania: Studi geologici (Giorgio Dal Piaz; Antonio De Toni); studi geografici (Roberto Almagià), Part I, Soc. Italiana per il Progreso delle Scienze, Rome, 1915.

Ekrem Bei Vlora: Aus Berat und vom Tomor (Zur Kunde der Balkanhalbinsel I, Reisen und Beobachtungen, Vol. 13). Sarajevo, 1911.

Praschniker and Schober: Archäologische Forschungen in Albanien und Montenegro, *Denkschriften Kaiserl. Akad. der Wiss. in Wien*, 1919.

Camillo Praschniker: Muzakhia und Malakstra, *Archäolog. Inst. Wien*, 1920.

Ludwig von Thallóczy: Albanisch-Illyrische Forschungen, 2 vols., Munich and Leipzig, 1916.

Morphology is dealt with more comprehensively in the author's paper "Morphogenetische Studien aus Albanien," *Zeitschr. der Gesell. für Erdkunde zu Berlin*, 1920, pp. 81-117.

For a map showing central Albania in relation to the whole country see that accompanying "Albania and the Albanians" by H. Charles Woods, *Geogr. Rev.*, Vol. 5, 1918, pp. 257-273.

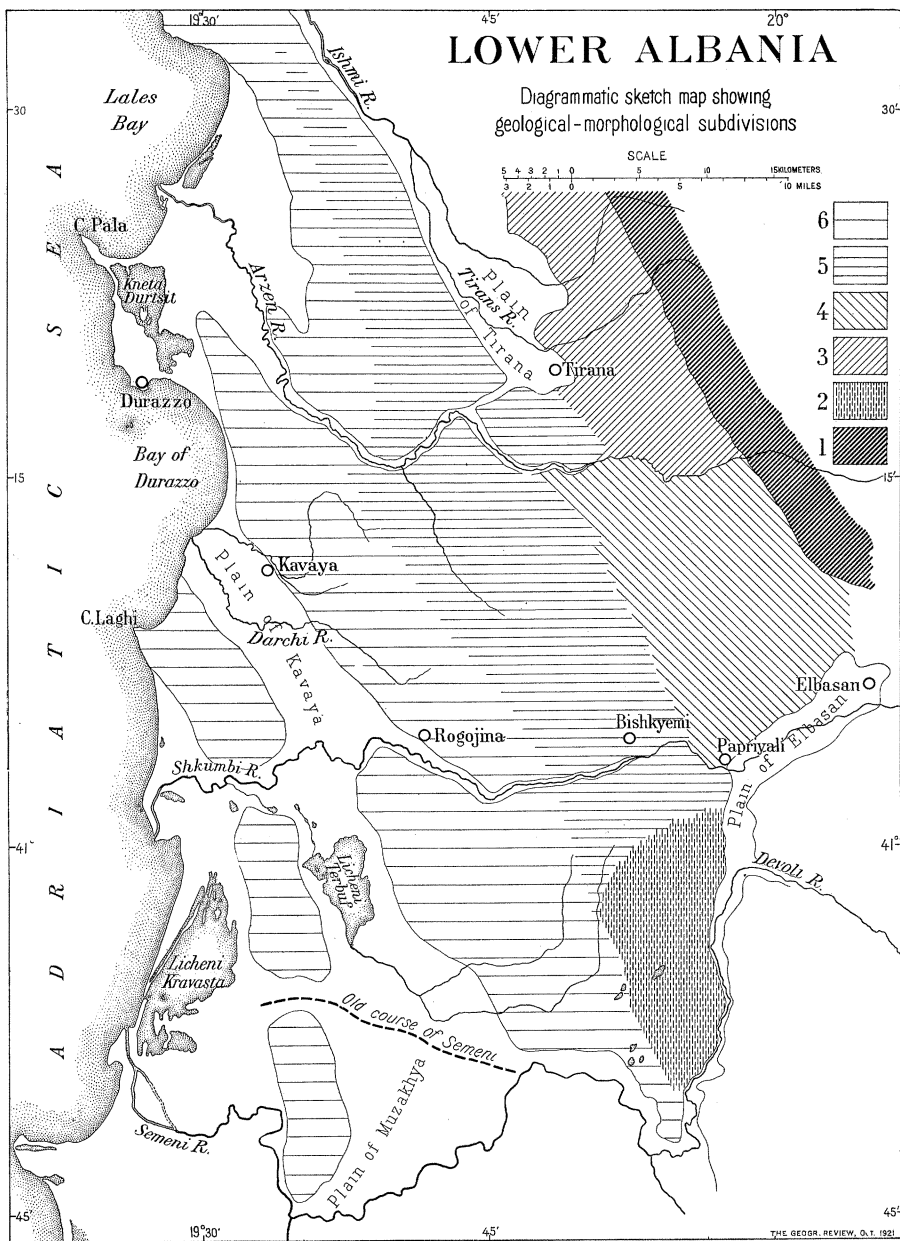


FIG. 1.—Diagrammatic sketch map of Lower Albania showing geological-morphological subdivisions. Scale approximately 1:560,000. Reference to numbers in key: 6, low hills (to 200 meters), near the coast, composed in the main of Pliocene deposits and of youthful morphological character; 5, higher hills (to 500 meters) Miocene and younger flysch (Oligocene-Miocene) in a more advanced morphological stage; 4, higher mountains (to 1,000 meters) in general flysch and of a early-mature morphological stage; 3, escarpments of Tirana, flysch, Miocene (shore facies), and lowest Pliocene strata (brackish shales); 2, lake plateau of Belis, young shallow karst; 1, limestone chain of Mali Daytit of Cretaceous-Eocene age.

In the uppermost Miocene occur thin beds of lignite, economically of no more than local interest. The series is highly fossiliferous, and it has proved possible to make a detailed subdivision of the deposits, which, as Dal Piaz and De Toni have pointed out, are quite similar in their development to the Italian deposits of the same period.

Everywhere the Tertiary deposits of Lower Albania are disturbed by folds, fractures, and overthrusts. Broadly speaking, the rock structure may be described as characterized by two great anticlinal regions with intervening synclines. The folding process set in with the middle of the Miocene and continued into the Quaternary. It was the elevation attendant upon folding that brought Lower Albania above sea level; and the uplifting process appears to be active even at the present time.

### LAND FORMS

On the whole, the topography has developed sympathetically with respect to the structure. The grain of the country trends from north-north-west to south-southeast, meeting in an acute angle the shore of the Adriatic which in this latitude trends from north to south. The hilly zones correspond to the anticlines and form promontories on their seaward ends—Capes Rodoni, Pala, Laghi—between which the shore retires in flat bays, marshy for the greater part and characterized by lagoons, barrier beaches, and dunes. Inland wide plains (corresponding to the synclines) extend from the bays—the Ishmi plain and the plains of Kavaya and Muzakhya. Morphologically this coast is in sharp contrast with the remaining part of the western coast of the Balkan Peninsula which trends northwest to southeast and is a type of depressed coast with steep shores.

Owing to the slight resistance of the generally unconsolidated Tertiary deposits the landscape of Lower Albania is superficially mature, with well-molded and completely integrated hill slopes and large open valleys especially near the shore. In the hill zones bordering the shore are little-dissected tectonic forms (anticlines) which have the gradients of maturity but which are really youthful. Inland from the coast the forms depend not so much upon the disposition of the original folds as upon the relative resistances of the rocks. Here the elevations are greater and the topographic texture is coarser, as in the Shkumbi territory. Thus certain differences in the scenery are not a consequence of differences in stages of topographic development but of different elevation and lithological character.

The stage of early-mature dissection which marks the inner portion of the shore belt known as Lower Albania is distinctly expressed in the escarpments that constitute the foreland of the Inner Albanian mountains east of Tirana. Here subsequent development of the valleys is in a beginning stage; obsequence and resequence are scarcely exhibited at all.

“Bad lands” form a local feature of the scenery of Lower Albania and give it the characteristic stamp of early maturity. They are mostly developed on



FIG. 2



FIG. 3

FIG. 2—The low hill country (Pliocene) near the coast is in a youthful stage of morphological development. Photograph in the Licheni Terbuf region.

FIG. 3—Typical landscape in the hill country (Miocene) between Tirana and Durazzo. Morphological development further advanced.

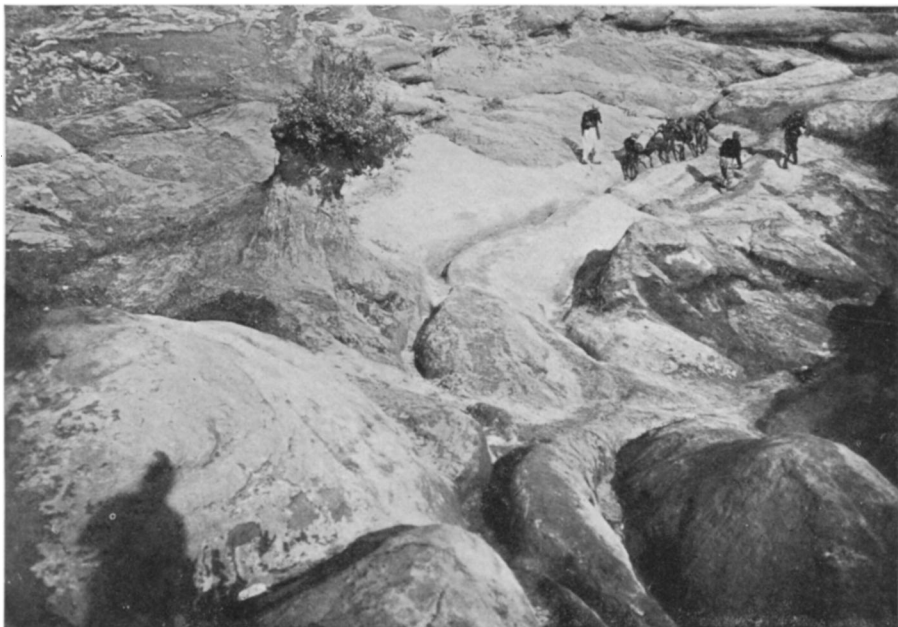


FIG. 4



FIG. 5

FIG. 4—Characteristic forms of weathering in the Pliocene sandstone of the escarpments of Tirana.  
 FIG. 5—"Bad-lands" topography in the flysch of the Tirana escarpments.

the flysch, especially where it is composed of easily destructible shales and clays; but they were also observed in the Fliocene marls and clays near the shore, for example at Cape Laghi. Lithological character, however, is not the sole determinant of the "bad-lands" topography. Climatic conditions—a period of intensive rainfall in autumn—and deforestation also play a prominent part.

Finally there is an area in Lower Albania where erosion takes place not in a normal way but in a manner characteristic of the karst. This area is a table-land (lake plateau of Belis) of low elevation west of the Devoli valley.

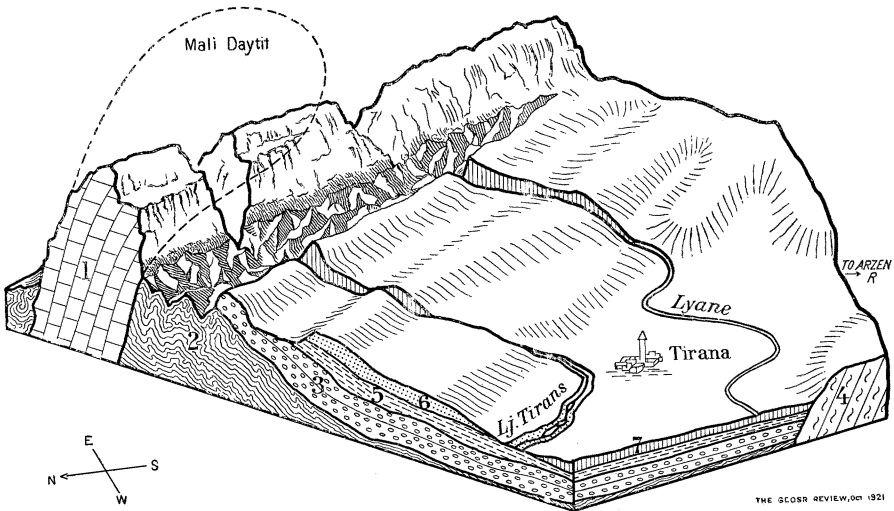


FIG. 6—Block diagram of the eastern margin of the Tirana plain (escarpments of Tirana). Reference to numbers: 7, alluvium; 6, lowest Pliocene sandstone; 5, uppermost Miocene (brackish strata with lignite beds); 4, Upper Miocene sandstone; 3, Miocene (in shore facies east of Tirana); 2, older flysch (in general Eocene); 1, limestone (Cretaceous-Eocene age).

The prevalent rock is a gypsum-limestone (probably of Lower Miocene age). The surface is marked by many small lakes in sink holes, and there are residual hills rising above the general level. This karst land has the distinctive stamp of youth. The sink holes are still separated by large inter-fluvial spaces.

The recency of uplift is shown in the character of the rivers and river terraces. In the plains of Shyak (lower Arzen), Kavaya, and Muzakhya the rivers are eroding strongly: Arzen, Darchi, Shkumbi, Semeni, Yanitsa flow in steep-walled beds entrenched to depths of six to eight meters. Exceptionally there are seen the effects of local movements of depression.

An interesting hydrographic feature is exhibited in the strange divide between the Shkumbi and Devoli near Elbasan. Here the two main rivers of central Albania, whose headwaters and mouths lie far apart, approach to within a distance of seven kilometers in an almost wholly plain country. The plain of Elbasan, about 16 kilometers long and not quite one kilometer

broad, corresponds to a transverse tectonic depression. The Devoli just touches the southern margin of the plain and then turns away in a sharp bend. The Shkumbi after traversing the plain pursues its antecedent course across the mountain region on the west instead of using the open way to the south.

The early Pliocene Shkumbi had a full mature valley the bottom of which can be identified as far as Inner Albania. It flowed in the direction of the present plain of Elbasan and the lower valley of the Devoli, discharging into



FIG. 7.—In the middle ground the escarpments of Tirana (the nearer slopes Pliocene sandstone zone, the farther lithothamnitic limestone zone); beyond, the wall of Krupa surmounted by the Miocene platform (see Fig. 27), and the summits of Mali Daytit.

a bay in the vicinity of what is today Berat. Here Pliocene deposits have been recognized by Dal Piaz and De Toni. At the end of the Pliocene or the beginning of the Quaternary the section of the valley which today is represented by the plain of Elbasan was submerged below the base level of erosion by tectonic sinking<sup>2</sup> combined with fracturing, and a lake was formed.<sup>3</sup> The lake was short-lived, being partly filled up by aggraded matter and partly captured from the west by a headward eroding coast river. The Devoli encroached upon the territory of what was the lower part of the Shkumbi, and in the now unused stretch of valley between the elbow of capture and the former mouth of the Devoli the present divide was formed (Fig. 8). It is interesting to note that the Shkumbi, owing to its shorter course

<sup>2</sup> Of this were found numerous geological proofs which cannot be detailed here. The plain is a landscape "drowned" in débris.

<sup>3</sup> According to Dal Piaz and De Toni Quaternary lake deposits are laid bare by cutting of the Devoli at the southern end of the plain.

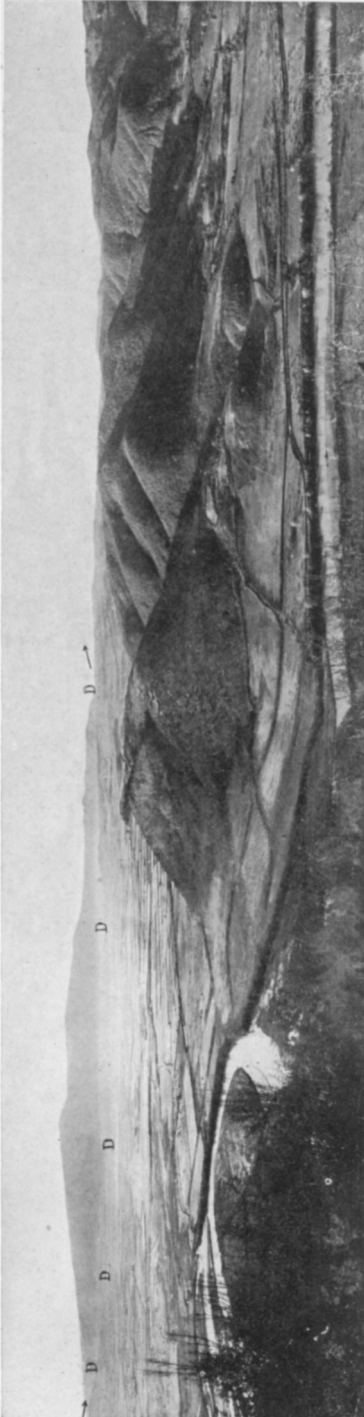


FIG. 8.—The Shkumbi leaving the plain of Elbasan to cross the hills to the west. The photograph shows the present divide (D) between Shkumbi and Devoli. Note also the subdued forms of the bushwood-covered hills.

and steeper gradient, is now the stronger river and is likely to encroach wholly upon the Devoli; so that the vacant part of the valley will again be occupied by a river, but one flowing in the opposite direction, while the lower valley of the Devoli will be abandoned.

Differential uplift is exhibited in the discordance of levels of river terraces not only of various rivers but in different sections of the same river. On the lower Shkumbi between Papriyali and Rogojina two levels of terraces may be recognized. The Shkumbi valley is here composed of wide tracts of mature character and of short narrows of youthful stamp, a feature which cannot here be attributed to lithological differences. Above Bishkyemi the lower level extensively strewn with gravel is developed 10 to 15 meters above the river. Downwards where the valley is wide the level, according to Almagià, is developed at a lower elevation, and the terrace is supposed by him to be alluvial. Furthermore, especially in the narrows, remnants of gravels were found 30 to 40 meters above the river on sloping plains. Near Bishkyemi is a well developed gravel-strewn plain extending for a kilometer in length and sloping from about 50 to 60 meters relative height to about 30 meters in the direction of the river. Almagià notes a longer terrace at a height of about 40 meters. All these remnants of higher terraces appear to belong to a single old bottom which has been strongly warped. On the Kavaya rivulet are one-sided terraces that indicate a one-sided uplift, a continuing growth of the anticline at the expense of the syncline.

## VEGETATION

Generally speaking, the vegetation of Lower Albania with its inconsiderable elevation and exposure to maritime influences belongs to the Mediterranean province. It is characterized by the occurrence of evergreen plants, including that typical formation the so-called maquis, and of certain cultivated plants, especially the olive.

From a geographical point of view the writer would class the types of vegetation as follows: (1) deciduous timber forest, (2) deciduous bushwoods, (3) evergreen shrubs (maquis), (4) heath and grassland with shrubs, (5) cultivated grounds, (6) neglected plantations (above all, the neglected olive plantations), (7) deserts.

In Lower Albania these types of vegetation prove to be chiefly dependent on geological conditions (chemical and physical qualities of soil), topography, and situation relative to human settlements.

## TIMBER FOREST

Timber forest is found in few parts of Lower Albania, though where found the forests are often extensive. It is confined to the marshy lowlands near the coast and to the heights of the more distant mountain regions. Evidently these forests are only the remnants of a once more extensive cover preserved in the less accessible regions. In places the soil also seems unsuitable for the development of a forest vegetation. In the flysch, a formation here widely distributed, scarcity of water ranks above all other unfavorable factors. Only where coarser sandstones and conglomerates are intercalated in the almost impervious strata, as in the region south of Shkumbi near Papriyali, do we find forest growth on this formation.

Besides the marshy alluvial lowlands round the river mouths the soft (Upper Miocene) sandstones which occur largely in the country between Tirana and Durazzo also seem favorable to the growth of a luxuriant forest vegetation. The most beautiful forests seen by the writer were on the one hand in the lowland of the Mati River and on the other hand on the heights to the south of Cape Rhodoni. The lake plateau of Belis also has an extensive timber forest.

The forests of Lower Albania are composed almost entirely of oaks. Everywhere there is a dense undergrowth of ferns, ivy, and creepers, mostly spiny. All the forests are in a primeval state.

## BUSHWOOD

By far the most generally distributed form of vegetation in Lower Albania is the deciduous bushwood. Together with the belts intervening between it and the scant ground cover of the desert lands it may occupy two-thirds of the area. Its chief components are various species of oak (among them *Quercus coccifera*) and beech. Their stunted growth is probably due to the age-old abuses of man and the browsing of goats. In

spring the bushwoods are bright with an exceedingly rich flora—crocuses, violets, anemones, and the like.

### MAQUIS

Maquis occupies comparatively little ground in Lower Albania. Its dependence on soil composition is marked. I found it distinctly confined to a soil rich in iron and silica but dry and poor in humus. It thrives well on the coarse ferruginous quartz sandstones and quartz conglomerates such as appear in a middle horizon of the flysch.

The most important forms of the maquis here are: tree heath (*Erica arborescens*) and oleander (*Nerium oleander*); then an ash (*Fraxinus rostrata*), the mastic tree (*Pistacia lentiscus*), juniper, *Phillyrea*, and broom. More rarely I found myrtle, the strawberry tree (*Arbutus Unedo*), holm oak, and others.

One of the most extensive maquis forests of Lower Albania appears on the zone of Lower Pliocene sandstone in the escarpments of Tirana. Wherever these sandstones outcrop they are covered almost exclusively by tree heaths and oleanders of a rare luxuriance, a feature which contributes much towards the distinctive physiognomy of the landscape. Elsewhere I found a continuous maquis cover only in the hill country on the border of the plains (east of Kavaya and the Muzakhyà). Here in one place I also found yucca growing wild. Some elements of the maquis, especially the tree heaths, appear not infrequently mixed with deciduous trees. Such a type of mixed forest is especially common in the country between Tirana and Durazzo.

### HEATH AND GRASSLAND AND MARSH

Evergreen as well as deciduous forests often pass into heath; and this form of vegetation, widely spread in Lower Albania especially on the hills near the coast, is again intimately connected with grassland and pastures. The rockrose (*Cistus*) with its splendid red and white blossoms, then rosemary, and sage are dominant in these heaths. Thickets of juniper, broom with its bright yellow flowers, thorns (*Crategus*), and again the tree ericas make a characteristic appearance in the heath. Of other plants special mention must be made of the asphodel (*Asphodelus ramosus*). In certain areas its immense numbers make it the most striking feature of the spring landscape.

The same shrubs and plants are met with again in the grasslands which are mostly connected with the heath but also are not infrequently interrupted by cultivated ground. But, whereas the heaths apparently favor the dry slopes with sterile soil (sandstone and conglomerate), the grasslands extend into the lowlands where they are associated with a swamp vegetation. Grassland as well as heath predominates in the coast regions especially in the plain of Kavaya about the Licheni (Lagoon) Terbuf where, often interspersed with juniper, it ascends the flat hills towards the east.

In spring the grassland with its luxuriant green and its many blossoming shrubs presents a splendid appearance; but in summer, when all is dry, withered, and yellow, it has a monotonous character, and then this landscape with its expressionless forms is one of the most unattractive in Albania.

Marshy vegetation is prevalent not only in the wide stretches of lowland about the shore but also in the interior plains, which are flooded during the rainy season and far into the spring. Round the lagoons large areas are occupied by rushes (*Scirpus*, *Phragmites*, and *Typha*); in the interior plains various hard, tall, bog grasses predominate (*Polygonum*, etc.).



FIG. 9.—Bushwood and grassland with asphodels in the hill country near the coast.

#### CULTIVATED GROUND

Extensive areas of cultivated ground are found only in the plains round the larger settlements and in the larger valleys. Elsewhere are seen only single strips of fields interspersed between bushwoods, heath, or grassland and most particularly in the bottom lands of the smaller streams and brooks. The best cultivation is carried on in the plain of Tirana and the Muzakhya in the environs of Fyeri, the only sections where large estates are to be found. The lower valley of the Arzen, the valley of the Shkumbi below Bishkyemi, and that of the Semeni are also mostly occupied by cultivated ground.

The chief grain cultivated is maize; rye, barley, and oats are also grown, but in smaller quantities; and in some parts rice is grown, as in the Semeni valley.

The small fields of the peasants are almost always surrounded by hedges, in whose rich vegetation may be noted the pomegranate tree, conspicuous by its bright blossoms, and the Judas tree (*Cercis siliquastrum*). The arable

land itself, especially on the slopes, is well stocked with cultivated trees, above all the olive; then the fir, mulberry, walnut, and plum; more rarely the pear and apple. Orange trees are found here and there; but considerable groves are seen only in Elbasan, which has an exceptional climate. Round the settlements and in certain towns, such as Tirana and Fyeri, we find much land in gardens.



FIG. 10—Olive trees in the neighborhood of Tirana.

Notice must here be made of the solitary trees, preserved with solicitous care because of their shade value and their beauty. There are gigantic planes of many meters' girth and huge spreading branches. Tirana boasts a famous grove of such trees. As in the whole Mediterranean region, the cypress is a characteristic tree planted mostly as guardian of sanctuaries and shrines. The stone pine (*Pinus pinea*) is not common, but its peculiar umbrella-shaped crown is distinguishable at long distances. In the environs of Tirana and elsewhere the pyramid poplar (*Populus pyramidalis*) is planted

in long avenues and beside ditches. Neglected olive plantations are widespread in Lower Albania, extensive groves occurring in the neighborhood of the larger cities. Neglected vineyards are also seen; but, whereas one might attribute their condition to the Islamic religion, the complete neglect of the olives can only be considered as a proof of the great retrocession in culture that has taken place in recent centuries.

#### DESERTS

Deserts in Lower Albania are confined to the flysch. The causes of the poverty of the vegetation have already been mentioned. The extreme cases of the "bad-lands" topography are entirely destitute of vegetation or at most support only single shrubs, chiefly junipers. Here conditions for vegetation have been unfavorable from the beginning, and reckless cutting down of such woods as existed has laid these regions as completely waste as the karst lands of the Mediterranean. In the Krabe Mountains particularly there are wide stretches of this poor country almost entirely deprived of vegetation.

#### The Mountain Country of the Malakastra

The Malakastra comprehends the country extending from north to south between the Semeni and Voyusa Rivers and east to west from the Osum to near the Adriatic. Already a hilly country on its seaward border it steadily increases in height towards the interior and rises on its eastward border to a difficultly accessible mountain region with very few passes. In respect of its physiography as well as its civilization the Malakastra belongs to southern Albania.

#### GEOLOGICAL STRUCTURE

Geologically there is a rather close affinity between the Malakastra and Lower Albania. From this point of view the region is a transition area towards the mountain regions of southern Albania and Greek Epirus. The Malakastra, like Lower Albania, is underlain by Tertiary deposits except in the anticlines of the eastern Malakastra where older strata outcrop.

The marly and fossiliferous sands, conglomerates, and clays of the Pliocene in the westernmost Malakastra lie in the attitude of flat domes, whose axes strike from northwest to southeast. Towards the interior the intensity of the structural deformation increases; and, besides a steep inclination of the strata, there has been extensive fracturing along which overthrusts of older over younger strata have taken place. Towards the east the folding begins to assume a more meridional direction and at the same time a more compact orography with well-marked ridge lines. Here in the Middle and Upper Miocene solid resistant rocks, notably the lithothamnian limestones, appear and exert a marked influence on the modeling of the relief. Still farther towards the interior the characteristic structure of the eastern Malakastra begins. It is composed in the main of four great limestone anticlines (Cretaceous to Eocene) running parallel from south to

north with intercalated flysch in the synclines, intensely crumpled and plicated in detail. The two easternmost of these have their direct continuation in the folded Epirotic chains. In the south of eastern Malakstra appears a Neogene basin the eastern part of which has been overthrust by flysch. This marks the third and most important line of disturbance in the Malakstra. I could trace it northward for a distance of 30 kilometers, and it probably continues southward into the Voyusa valley.<sup>4</sup>

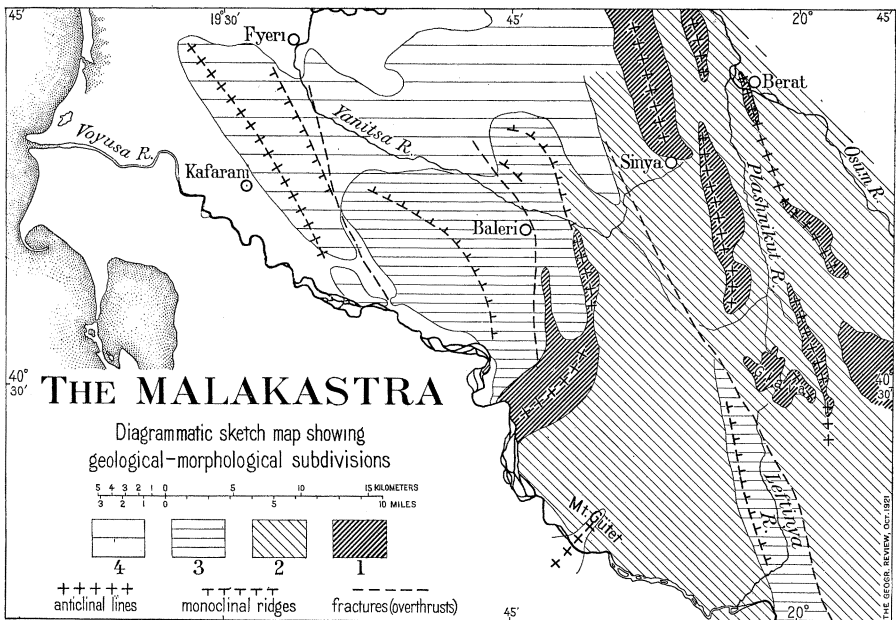


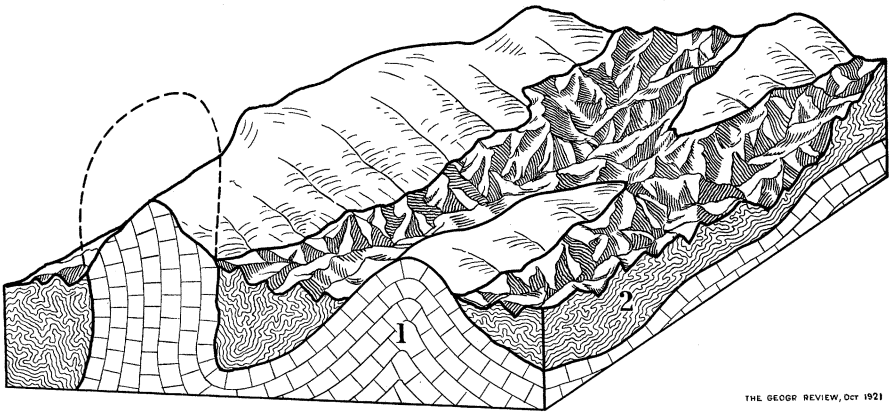
FIG. 11—Diagrammatic sketch map of the Malakstra showing geological-morphological subdivisions. Scale approximately 1:500,000. Reference to numbers in key: 4, low hill country of the westernmost Malakstra (to 300 meters) in general of Pliocene strata and of youthful morphological character; 3, higher hills (to 600 meters) of Miocene (Ostrea sandstone, lithothamnian limestone, and upper flysch) in more advanced stage of development (zone of monoclinal ridges); 2, flysch, partly "bad lands"; 1, anticlinal ridges of basal Malakstran limestone of Cretaceous-Eocene age.

It is evident that the tectonic processes in this region operated at the beginning of the Neogene, somewhat earlier than in Lower Albania, and similarly lasted without any considerable interruption into the Quaternary. The intensity of disturbance as well as the degree of erosion of the older strata show that the folding process progressed towards the north and west, in longitudinal as well as transversal direction, that is to say the folding of the Malakstra and Lower Albania is a continuation of the development of the Epirote mountains which were raised by folding in the Paleogene in a direction towards the Adriatic geosyncline.

<sup>4</sup> While this article was in the course of preparation newspaper despatches reported an earthquake here. It is probably connected with this young disturbance and is indicative of the present continuance of tectonic activity in the Malakstra.

## MORPHOLOGICAL DEVELOPMENT

As in Lower Albania, the landscape as a whole must be considered in an early stage of the geographical cycle. True, in many areas characteristic features of youth are wanting; but this may be explained in part by the incapacity of the marls and clays to preserve youthful forms for any length of time and in part perhaps by the fact that uplift has progressed so slowly that the leveling forces have had time to obliterate earlier features. In western Malakstra, however, we find the well-marked features of youth. The streams run in sharply entrenched valleys often entrenched in older and broader flats—a condition which, as in Lower Albania, points to a development in subcycles or episodes. The mountain slopes are furrowed by steep, deep-cut ravines; and landslides are of frequent occurrence.



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FIG. 12—Block diagram of typical country in the eastern Malakstra. Reference to numbers: 2, Paleogene flysch; 1, basal Malakstran limestone of Cretaceous-Eocene age.

Towards the east the landscape passes into a higher stage of development (late youth to early maturity). The inner portions of the anticlines, here consisting of hard limestone rich in flint, are modeled out in sharp relief, the contrast with the well-molded forms of the flysch being very pronounced. In the flysch of the Malakstra “bad-lands” topography is developed to a still higher degree than in Lower Albania. Especially is this so in the eastern part of the region in the wide synclinal area drained by the Plashnikut, a tributary of the Ossum. Tectonic activity in the Malakstra is seen in the hydrographic changes that cannot be explained by development in a normal, undisturbed cycle. There is, for instance, the peculiar position of the watershed between the Yanitsa and the Voyusa in western Malakstra. It approaches close to the Yanitsa, the entire area being drained asymmetrically to the Voyusa. The uppermost parts of several brooks are directed towards the Yanitsa but turn from it suddenly in sharp bends, being separated from it only by low, narrow saddles. Obviously the erosive

power of the Voyusa tributaries has been recently strengthened, and these streams have captured the tributaries of the Yanitsa. The one-sided strengthening of the erosive force can in this case be explained only by a tectonic and purely relative lowering of the local base level.

#### VEGETATION OF THE MALAKASTRA

Though the vegetation of the Malakastra is naturally largely identical with that of Lower Albania, the differences are worth noting for they show



FIG. 13—Landscape of the eastern Malakastra. An anticlinal limestone ridge (Mali Rahova) in the midst of flysch. To the left is the synclinal valley of the Plashnikut; on the right the high mountains of the Tomor. On the limestone ridge the track of a Roman road is plainly seen.

how sensitively the vegetable world reacts to geological and topographical variations.

Of the forms of vegetation existing in Lower Albania the timber forest is here almost entirely missing; scant trace is found only on the isolated heights of the southeastern Malakastra. Here, too, scarcity of water, much more marked than in Lower Albania, and devastation wrought by man are ascribed as causes.

Deciduous bushwood with the same components as in Lower Albania is the prevailing form of vegetation, and only in the western Malakastra does the maquis come to the fore. In this part of the region the maquis often attains a grandiose luxuriance. Slopes and ridges up to heights of over 600 meters are covered with thickets three meters in height. The mastic

tree and the ilex are the more conspicuous forms. The larger copses seem to be composed almost entirely of ilex whereas the mastic is found in light, parklike stands in the pastures. In the Malakastra, as in Lower Albania, the evergreen vegetation is notably confined to the porous soils rich in silica; the geology here is indeed a sure guide to the vegetation. Wherever the soil offers favorable conditions the maquis advances far into the interior; thus I found it even in the extreme east on the slopes towards the Ossum.

Here also gradual transitions lead from the maquis to the heath, which rarely occupies large areas. The grassland likewise is of limited extent, figuring largely only in the plain of the Voyusa and on the slopes of the western Malakastra towards this river.

Cultivated ground plays a somewhat more significant part in western Malakastra, though even here there are no extensive cultivated areas but mostly the small, garden-like fields of the peasantry. The olive tree, neglected here too, is very common, and the fig tree more so than in Lower Albania. The fig produces abundant fruit.

In the eastern Malakastra the cultivated ground forms no more than isles in the neighborhood of communities. In particularly favored sites fields and olive groves are found up to an elevation of from 700 to 800 meters. This is, for instance, the case in the pass of Sinya, where a fertile, residual limestone soil (*terra rossa*) occurs at the foot of the anticlinal ridge of Shpiragri. *Terra rossa* also fills the sink holes of the summit of the ridge at a height of almost 1,200 meters, and these too are cultivated despite their inaccessibility.<sup>5</sup> For the rest the scenery of the eastern Malakastra is dominated by bushwood in its southern part towards the Voyusa, by deserts in the north. The limestone for the most part, and the flysch as well, is barren, clothed only by shrubs, mostly juniper. In the western Malaskastra only part of the flysch and the lithothamnian limestones are barren.

### Population, Settlements, and Routes of Lower Albania and the Malakastra

Lower Albania and the Malakastra are regions of ancient settlement and were once, in contrast to modern conditions, seats of a highly developed culture. In the seventh century B. C. colonies were founded by the Greeks. The pastoral Illyrian peoples who here, as in the whole northwestern part of the peninsula, formed the aboriginal population were driven back into the interior. The first cities founded were Epidamnos, later on named Dyrrhachium by the Romans, whence the modern Durazzo (Albanian, Durrës), and Apollonia. Apollonia was magnificently situated on the last spur of the Malakastran ranges towards the sea, commanding the bay of Valona. Under the Romans the city became a stronghold of intellectual culture and, as a river harbor (on the Voyusa, which has since changed its course), a most

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<sup>5</sup> Elsewhere sink holes have not been developed in the limestone of the Malakastra; and the sink-hole vegetation, so important in other parts of the eastern Adriatic coast lands, is here insignificant.

important trading center. All traces of the populous city of Augustan days have disappeared except a few insignificant remains of walls.<sup>6</sup> On its site stands today the picturesque old monastery of Poyani. Stones from the antique city bearing reliefs, sculptures, and inscriptions have been carried away, often to considerable distances, in the stoneless regions of western Malakastra and the Muzakhya, there to be used in the construction of buildings, especially churches.

Another great Malakastran city of antiquity was Byllis. It likewise was



FIG. 14—Typical scenery in the Malakastran mountains. A group of houses, *kulas*, with old oaks on a ridge crest.

a Greek foundation on the Voyusa, placed on a commanding height 500 meters above the river and some 35 kilometers farther towards the interior. Besides remains of the encompassing walls and their towers, traces of an amphitheatre have been discovered. An inscription in its original situation makes identification positive. Undoubtedly many archeological treasures here await reclamation.

Throughout Roman rule Lower Albania and the Malakastra were in a state of prosperity. Malakastra in particular was dotted with settlements and was provided with a network of good roads.

With the barbarian invasions and the downfall of the Roman Empire the seats of culture in Albanian territory began to decline. Durazzo, indeed, still remained for some centuries an important stronghold of the Byzantine Empire; but Apollonia, mentioned for the last time in the sixth cen-

<sup>6</sup> Special reference should be made to the important archeological researches in central and southern Albania made during the war by Dr. Camillo Praschniker at the order of the Austrian Government. See footnote 1.

ture, disappeared altogether. The Roman and Hellenic elements gave way more and more; and in their place there began to be felt Slav influence from the north, though several monuments have been preserved from Byzantine times. In the fourteenth century commenced the Ottoman invasions from Asia and Albania's heroic age—culminating in the triumph of Skanderbeg, who with Venetian aid from Durazzo held the Turk in defiance. After his death, however, Ottoman advance was no longer to be stayed, and in the struggles that followed the last traces of the numerous, quondam flourishing



FIG. 15—The monastery of Poyani on the site of the old Roman city of Apollonia.

settlements were destroyed. Progressive decay set in, reducing Albania to that low state of culture in which we see it today. The process of Mohammedanizing began with the sixteenth century and spread rapidly. Today the Moslem element is very prominent, especially in the cities.

#### PRESENT ELEMENTS OF POPULATION

We see then an aboriginal Illyrian population successively subjected to Hellenic, Roman, Slav, and Ottoman influence during the course of which the original element has been largely submerged. It is best discernible in the language; which, however, does not show even ten per cent of pure Illyrian roots. Owing to the impassable nature of the country foreign influences have penetrated very unequally. On the coast of Lower Albania Roman influences from the opposite shore of the Adriatic are still apparent, the last wave of this influence dating back to the times of Venetian rule. In the south, even in the Malakastra, Greek penetration is evident; in the

north that of the Slav. The Ottoman element is almost universal, predominating especially in the interior of Lower Albania. Particularly through religious evidences do these various spheres of foreign influence obtrude themselves upon the eyes of even a hasty traveler. In the interior of Lower Albania the minaret is seen everywhere and with the characteristic Moslem cemetery adds a distinctive note to the landscape. In the south and the north are equally typical Christian churches, the majority in ruins.



FIG. 16—A Tosk wearing the costume of southern Albania.

Today the Albanians are divided into two chief groups differing considerably in language and customs: the Ghegs in the north and the Tosks in the south. Generally speaking, the Semen is the frontier. Lower Albania therefore has a Gheg, the Malakstra a Tosk population. In addition there are certain unassimilated elements who live for the most part in isolated colonies and are sharply differentiated by their peculiarities. Such are the gypsies and the Kutzo-Vlachs. For curiosity's sake the remains of a negro colony at Berat may also be mentioned.

#### BODILY AND MENTAL QUALITIES

As regards physical qualities the Gheg seems highest to me as I met him in the country near Tirana. The weekly markets gave ample opportunity for admiring the forms of these tall, lithe, sinewy men attired in their becoming costume. Among the women, too, who elsewhere in Albania can hardly boast of particular charms, beautiful figures and regular features are often to be found in this part of the interior. On the contrary the population of the regions near the coast shows signs of physical degeneration, a circumstance largely attributable to malaria, the scourge of the marshy lowlands. Dress and dwellings, too, are much more neglected on the coast, and the general Albanian dislike of work is exaggerated. The population of the westernmost Malakstra also suffers considerably from malaria.

The Tosk, the inhabitant of the Malakstra, has a shorter figure than the Gheg, less sharp features, and greater mobility. In intercourse, contrary to



FIG. 17



FIG. 18

FIG. 17—The weekly market of Tirana showing the costume of northern Albania. A gypsy woman in the right foreground.

FIG. 18—Kutzo-Vlach women at Tirana.

the reserved Ghég, he shows some obtrusiveness. The bias towards the national character of the Greek is unmistakable.

As to religion the Albanian, both Moslem and Christian, in Lower Albania and the Malakstra strikes one by his extreme laxity, an external sign of which is his neglect of the places of worship and the cemeteries. Only on certain holidays is a religious feeling—much mixed, however, with profane interests—apparent. The clergy everywhere are like the rest of the people on a low stage of culture. Yet the Albanian is not wanting in intellectual capacity: even more, a genuine thirst for knowledge may be observed. Albanians have risen to high positions in the Turkish Empire, and Albanians

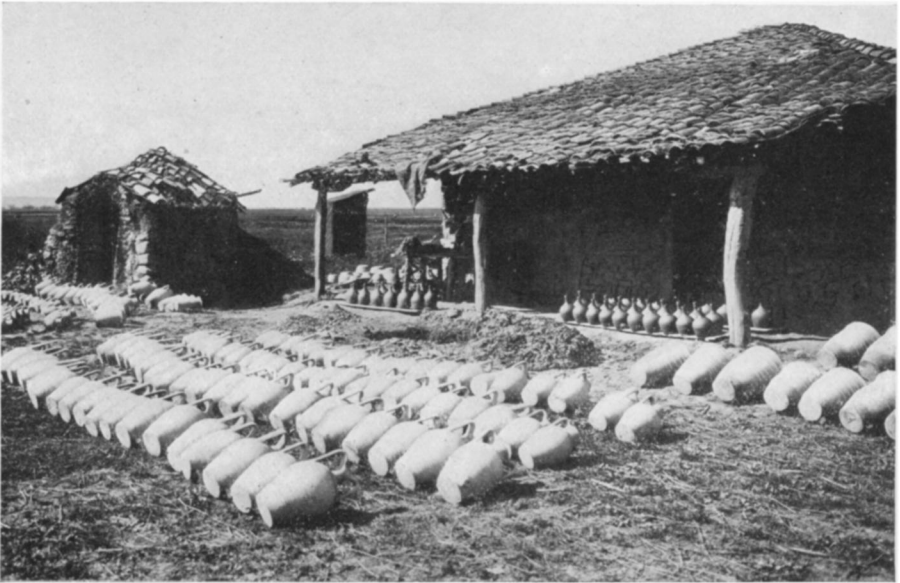


FIG. 19—Pottery at Kavaya. Pottery making is the most important indigenous trade of Lower Albania.

living abroad have distinguished themselves in literary spheres. In the country today the status of education is low, and the short period of independence has not sufficed to alter these conditions in spite of ardent desire for reform.

#### AGRICULTURE AND TRADES

The chief occupation of the inhabitants of Lower Albania and the Malakstra is agriculture. But it is not developed to the extent one would expect from the general fertility of the soil, which in the plains is for the most part of very good quality, and the remarkably mild climate. In the plains wide tracts of suitable land lie uncultivated, and still more might be made available for agriculture by a simple system of irrigation. The people commonly grow only sufficient crops for their immediate needs, unimportant exception

being made in the case of certain *latifundia* in southern Muzakhya and near Tirana. The mode of cultivation is the most primitive imaginable. Rotation of crops and manuring are unknown. The commonest agricul-

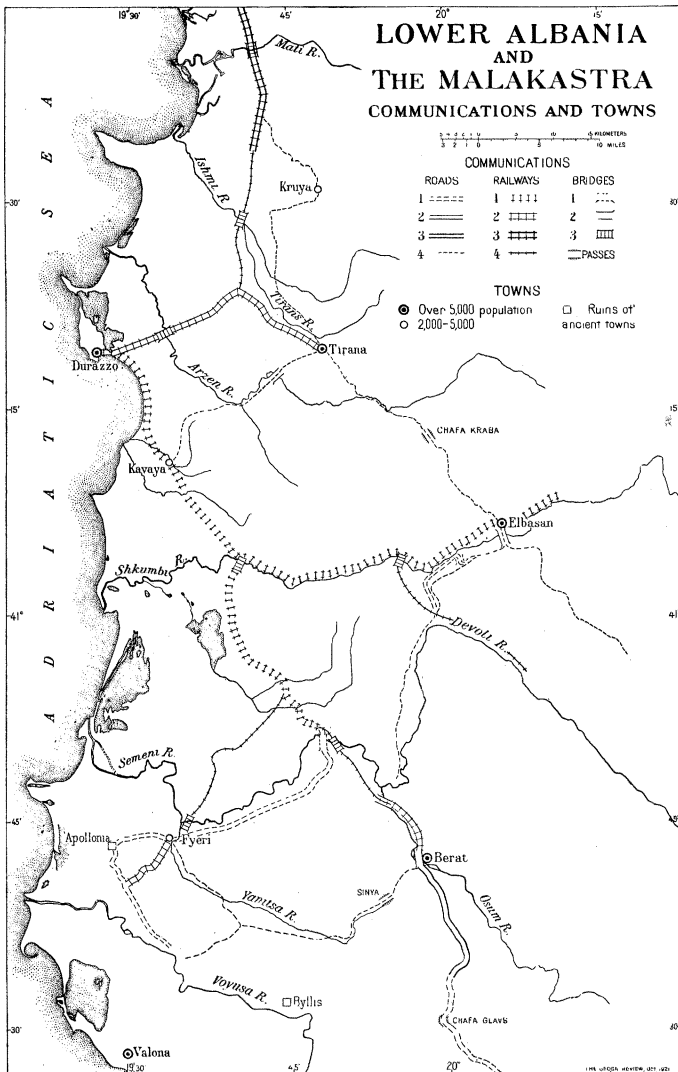


FIG. 20—Sketch map showing the most important settlements and routes in Lower Albania and the Malakstra. Scale 1:1,000,000.

tural implement is a wooden plow which loosens, but does not turn, the soil. Neglect of the olive groves, which could be made the basis of a most productive industry, has already been mentioned. There is hardly a doubt that by intensive farming Lower Albania could provision the whole of the country

and even have a considerable surplus of certain products, oil and tobacco for instance, for export.

In the more mountainous parts—in the Krabe Mountains of Lower Albania and the eastern Malakstra—grazing, more particularly of sheep and goats, becomes more important than agriculture. Here too we meet the most primitive conditions. Stables for the animals are almost unknown;



FIG. 21—Mosque in Tirana.

dairy farming is little developed. Horses, a small hardy native breed, and asses are used for riding and transport. The buffalo is commonly used as draft animal in the plains; it is harnessed to a grotesque-looking cart provided with extremely high wheels on account of the deep mud of spring.

In Lower Albania the most important indigenous trade is pottery making. In certain towns, especially in Tirana, such mechanical arts as filigree, niello and brass work, and the carving of tobacco pipes are pursued. Mag-

nificent embroideries distinguished by good taste in color and design are made by the women and sold on the market place.

#### SETTLEMENTS AND HOUSE TYPES

Four main types of settlements can be distinguished in our region—compact settlements, group villages, scattered mountain villages, and isolated



FIG. 22—In the inner part of the town of Berat.

farms. In Lower Albania the compact settlement prevails with, in addition, isolated farms in the plains and scattered villages in the hills. Throughout Malakastra the scattered mountain village prevails with the group village in addition.

Albanian house types fall into two classes—the stone house, *kula*, and the mud house. The town house might be added as a third type, but this is not indigenous; it shows features common in all countries that have come under Turkish rule.

The mud house, which is confined to the plains and the contiguous hill country, is most characteristic of the coastal regions. Occasional examples may be seen up the valleys of the larger rivers. The mud house is built of sun-dried bricks with a framework of crossbeams and a roof of pantiles or, because of the lack of suitable timber, of reeds over a rough support. In the most primitive forms the walls are of willow hurdles or reeds chinked and daubed over with clay. A characteristic feature of village scenery is the sharply pointed conical sheepfold of willow stakes.

The *kula*, which is the house type of the remainder of Lower Albania and the greater part of the Malakstra, is of rude stone, not even roughhewn. It is without apertures on the ground floor and above is pierced only by a few loopholed windows that confer upon it the appearance of a fortification, which indeed is to some extent its function.

### TOWNS

Lower Albania has four towns with over 5,000 inhabitants—Durazzo, Tirana, Elbasan, and Berat—and two smaller ones (2,000 to 5,000), Kavaya and Fyeri. These only of the larger communities have an urban character.

Durazzo still remains the principal port of Albania, though the harbor is choked with sand and vessels must anchor in an open roadstead. The town with its narrow, crooked alleys of small ill-kept houses lies at the foot of Mali (Mt.) Durtsit which rises like an island out of the marshy ground. Dominating the town is the mighty Venetian fortress partly rebuilt by the Turks but today mostly in ruins. Of the buildings of antiquity none remain; sculptures, inscriptions, and other relics have been found, but none of them in their original positions. In spite of its small size (estimated population 5,000) Durazzo, because of its favorable geographical and strategic position, was selected as the capital of the late principality. It has the largest import trade in the country and is the starting point of the chief routes into the interior.

Tirana (12,000), connected with Durazzo with what was before the war the only highroad of the country, is the center of the northern part of Lower Albania. Unlike malaria-stricken Durazzo Tirana is situated in a beautiful and healthful region on the margin of a fertile plain at the foot of the mountains. Tirana is a scattering garden town centered round a rich bazaar with arcades, broad paved streets, and squares ornamented with fountains. Numerous mosques richly decorated with gaily colored Moorish ornamentation embellish the city. Founded by the Turks in the seventeenth century Tirana exhibits a rare purity of oriental architecture, and the greater part of its inhabitants are Moslem. The town is a favorite residence of certain noble families who here possess palace-like houses. Besides being a center of trade Tirana is also distinguished for its industries.

Elbasan, situated on the Shkumbi where it leaves the mountains of Inner Albania, is the largest city of Lower Albania (over 13,000 inhabitants). It

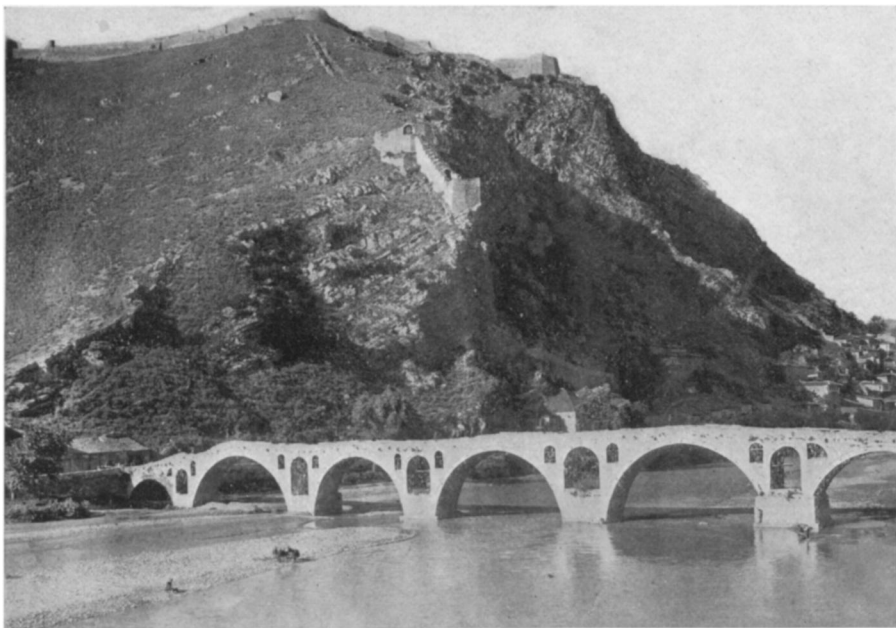


FIG. 23



FIG. 24

FIG. 23—The water gap of the Ossum at Berat, crossed by a stone bridge of Turkish build. To the right is seen a part of the lower town of Berat.

FIG. 24—The upper town of Berat.

is a foundation dating from the early days of the Ottoman invasion, the middle of the fifteenth century. The remains of a large fortification are still preserved at its center, and in general, with its plane-shaded fountains and its half-ruined mosques, the town presents an air of picturesque antiquity. According to Dr. Praschniker the Ottoman structure rests on an older foundation probably dating from Roman times. Discoveries of sculpture and an inscription also indicate an early settlement on this site. The importance of Elbasan lies in its situation where the only transverse road at all practicable for wheeled traffic enters the mountains. As in Tirana a brisk business is transacted at the weekly markets; but, whereas in Tirana industrial wares figure largely, here it is oil and tobacco, the produce of gardens, flocks and herds. Elbasan conducts the interchange of products between mountain and plain.

Berat (8,500) occupies a similar situation on the frontier between Lower Albania and the mountains of the interior. The city, which is divided into a lower and an upper town—the latter girdled by old defenses, is set in the midst of magnificent scenery. Here the Ossum forces its way in a narrow gorge through the anticlinal ridge. In the background are the steep-sloped highlands of the Tomor, snow-covered far into the summer. Berat is a bridge town. From it a longitudinal road, crossing the Ossum by a mighty stone bridge of Turkish build, leads through the eastern Malakastra towards the south. Traces of the foundation of a fortification which, in its essential features, is of Byzantine character indicate early settlement on this spot. Today Berat is the center of culture for all central and southern Albania. To its sphere of influence in particular belong a great part of the Malakastra, and the valleys of the Semeni, Ossum, and Devoli. The population is almost purely Tosk, though here in the south the Greek Orthodox element begins to enter.

Fyeri is a local center for the southernmost part of Lower Albania, the Muzakhya, and the western part of the Malakastra. Its 2,000 inhabitants include a strong Greek Orthodox element. Fyeri is a garden town with a small commercial quarter where picturesqueness is spoiled by several ugly west-European buildings.

The Malakastra has no towns today although in classical times it boasted two large cities, already described, and numerous smaller settlements and fortresses.

#### COMMUNICATIONS

In briefly hinting at the conditions of traffic emphasis must first be laid on the extensive network of ancient roads, of which numerous traces have been preserved and which present the sharpest contrast to modern conditions. It is true that considerable transformation was effected during the war, but one may doubt whether this improvement will last.<sup>7</sup>

<sup>7</sup> For an account of improved communications in southern Albania effected during the war see George P. Scriven: *Some Highways of Albania and a Forgotten Riviera*, *Geogr. Rev.*, April, 1921.



FIG. 25—Tirana. Bridge over the Lyane and an old cypress grove.

The most important line of traffic in ancient times was the transversal road, the Via Egnatia. From two starting points on the coast, Durazzo and Apollonia, it led up the Shkumbi valley across country to the lake of Okhrida and into Macedonia. During the war a light railway was erected directly on its foundations from Durazzo to Elbasan; and, thanks to the permanency of much of its construction, this line may be of lasting value. Some sections of the southern branch of the Via Egnatia were also used in the construction of a light railway.

A longitudinal line of traffic, evidently much in use in ancient times when more lively relations were maintained with the south but now without importance, runs from Elbasan to the south through Berat and the eastern Malakstra into Epirus. To the south of Berat the Roman track is clearly visible throughout the eastern Malakstra. The road was partly restored under Turkish rule. During the war it was used by the Austrian forces and as far as about 25 kilometers south of Berat was widened to permit the passage of heavy motor traffic.

Another important longitudinal route runs as a continuation of the southern branch of the Via Egnatia from Fyeri across the westernmost spur of the Malakstra on the one hand and on the other from Durazzo towards the north.

Before the war the only road passable for motor traffic was that between Tirana and Durazzo. From this an important branch road goes northward to Alessio and Scutari, probably following in large part a Roman road. During the war this line of communication was also provided with a light railway.

#### PASSES, MULE TRACKS

The routes considered above pass through the plains and by way of the larger valleys. There also exist important caravan roads making use of the mountain passes and only accessible for pack animals. Such are the roads from Tirana to Elbasan across the Krabe pass (640 meters), from Tirana to Kavaya, which makes use in part of the Arzen valley, and another crossing the Malakstra from east to west and utilizing the pass of Sinya (720 meters). In many places these paths show remnants of an old pavement, a type of "Turkish paved way" common elsewhere. It is rough and irregular and of little use except in the rainy season. The paved ways radiate in large numbers from the towns usually to pass shortly into the primitive paths which in the mountainous region follow the ridges as a rule.

Before the war even the most important routes were insufficiently provided with bridges. The Semeni was not bridged at all, the Shkumbi only at Elbasan. There were high-arched stone bridges of Turkish style across the Ossum at Berat and near the confluence of the Ossum and the Devoli at Banya. During the war a modern bridge 600 meters long was built across the lower Shkumbi near Rogojina (on the light railway from Durazzo-Kavaya to Fyeri), and two bridges across the Semeni, the one at Fyeri the

other taking advantage of a Roman groundwork at Kuchi on the light railway to Berat.

This conspicuous poverty of communications in Lower Albania is to be attributed not only to the low standard of culture but also in considerable measure to the nature of the country. On the one hand there is a lack of suitable stone for building and road construction; on the other hand the climatic conditions are unfavorable.

### Inner Albania

The Inner Albanian section of central Albania is predominately composed of Mesozoic and Paleogene strata involved in complicated folds and piled up in great overthrust masses. The mountain chains belong to the Dinaric system, which, as a southern branch of the huge Alpine system, stretches as a backbone through the western part of the Balkan Peninsula.

The Mesozoic is distinguished by the wide distribution of basic igneous rocks more or less metamorphosed into serpentine and closely associated with sedimentary material rich in shales, limestones, and flints, including pure flint beds (jasper slates)—a combination common to the whole of the inner Dinaric folds from Bosnia to Greece. The barren soil and the peculiar ferruginous color to which this formation (Upper Jurassic and Lower Cretaceous) weathers give a distinctive stamp to the Inner Albanian scenery.

The Upper Cretaceous lies unconformably over the serpentine formation mentioned above (in the region I investigated as an overthrust mass) in great massives of light-colored limestone that by their contrast with the dark, intimately crumpled and crushed rocks of the serpentine add another characteristic element to the scenery.

The flysch formation in Inner Albania is confined to the western marginal zone of the mountains where it is overlain by a great overthrust mass of the serpentine formation. This tectonic line is well marked by the appearance of bright cliffs where fragments of bulky white limestones have been squeezed in along the thrust plane.

On the extreme western border of Inner Albania is an anticline of nummulitic limestone. Like the limestone of the eastern Malakstra it is a transition formation between Cretaceous and Eocene. In the extreme east the uppermost part of the Shkumbi occupies a rift valley running north to south and containing Neogene deposits. It is the first symptom of the disturbance which finds its most characteristic expression in the sinking that produced the Dessaretic lakes. The soft forms of the Neogene basin contrast sharply with the border of strongly modeled mountain relief.

### MORPHOLOGY

The geological units of this complicated structure of Inner Albania determine the morphological units—outer marginal chain, zone of flysch, serpentine formation, limestone plateaus, Neogene basin. Morphologically Inner



FIG. 26.—The region of the middle Shkumbi in Inner Albania. The Shkumbi valley in the left foreground; in the middle ground the typically mature slopes of the serpentine formation (*Serpentin-Schiefer-Hornstein-Formation*) show distinct remnants of earlier river levels, the uppermost (Pliocene) being especially well marked; in the right background the snow-covered Polisit plateau (limestone); in the left background the Yablanitsa Mountains, the border of Macedonia. There are beech forests on the Polisit plateau; the serpentine rocks support only a poor vegetation. The line across the middle heights is the track of the only transverse road in Inner Albania (from Durazzo to Lake Okhrida).

Albania is in a mature stage of development. The mountain forms are strongly modeled, the forms well articulated except only on the limestone masses.

The character of the valleys, however, contrasts strikingly with the mature mountains. The three largest rivers of the country—Drin, Shkumbi, and Devoli—flow through Inner Albania in narrow, steep-walled, often ravine-like, valleys. I myself only followed the course of the Shkumbi. It is true that the narrowest ravine-like sections occur where the river breaks through limestone masses, but the character of the valley as a whole, as well as of most of its tributaries, does not correspond to the mature stage of the mountains but must be described as youthful. On the western margins it approaches maturity; it is most youthful in the central portion where the river has nowhere developed a flat. There is no doubt that Inner Albania has entered on a new cycle, that erosion has been rejuvenated by uplift and warping, strongest in the central part of the region. Evidences of this first cycle are seen in the remnants of valley flats preserved at relative elevations of 150 to 200 meters. In the central area, however, where the most intensive erosion is now in progress, remnants of the old valley floor are found at an elevation of 250 meters.

## EVIDENCES OF UPLIFT IN THE "WALL" OF KRUYA

Where the outer marginal chain of Inner Albania overlooks the escarpments of Tirana I made an important observation. Here, at an elevation of over 1,000 meters above the sea and at the top of a wall-like precipice, the so-called "wall" of Kruya, is a clearly defined shelf covered with small sink holes. Traces of Neogene beach breccia reveal it as the remains of a platform worn by marine erosion. Since the shelf was formed, as I have said, in the Upper Miocene, Inner Albania has risen more than 1,000 meters during which time folding was going on in the Neogene strata of Lower Albania; that is concomitantly an epirogenic movement in the old land, an orogenic movement in the new land.



FIG. 27—The Miocene platform on the slope of Mali Daytit. Compare with Figure 7.

Wherever limestones occur over considerable areas, as in the Polisit Mountains south of the Shkumbi, a karst landscape is developed which also bears features of maturity. The interfluves are small, appearing riblike between large coalesced sink holes.

The highest mountains of Inner Albania, reaching over 2,000 meters, exhibit traces of diluvial glaciation. From afar I could recognize such typical forms as cirques and U-shaped valleys, with morainic lakes and lakes in cirques—features that are apparent on the new map (replacing the old Austrian staff map, 1:200,000). Almagià has recently given a brief notice on glaciation in the mountains of central Albania in a more extended discussion of the better-known glaciation of the northern part of the country.<sup>8</sup>

<sup>8</sup> Trace glaciali nelle montagne dell' Albania, *Riv. Geogr. Italiana*, Vol. 25, 1918, pp. 85-95.

## THE VEGETATION OF INNER ALBANIA

Owing to the much greater absolute height and to the absence of immediate oceanic influence the vegetation of Inner Albania is essentially different from that of Lower Albania and the Malakstra. The subtropical forms retreat, and in their stead appears the forest vegetation of central Europe and, in the high mountains, arctic forms as well. In general the vegetation is poor, and large areas are desertic.

At heights between 1,600 and 1,900 meters I found compact timber forest composed of magnificent beeches. Pine forests ascend to far greater elevations. I did not become acquainted with them; but, according to Baldacci, pine forest consisting chiefly of *Pinus mughus* extends up the high slopes of Tomor (2,300 meters) to a little below the summit. Above 1,900 meters alpine forms, of which Baldacci has given an account, come to the fore.<sup>9</sup>

Below 1600 meters bushwood of oaks and beeches is again the dominant vegetation. It is sparse for the most part and everywhere passes into a shrubby growth which scantily clothes the rocky soil. Especially is this the case on the dry soil of the serpentine formation, highly siliceous and correspondingly poor of plant nutriment. The flysch also forms long stretches of desert, as is the case in Lower Albania.

Maquis is found only at the outer margin of the mountains, as in the region to the east of Elbasan, where it reaches an elevation of 600 meters and more. Farther in the interior the only evergreen shrub that I found in quantity was box, which grows along the brooks and on the lower slopes of the serpentine outcrops.

Grasslands and pasture grounds are unimportant in the inner mountains of central Albania. In this respect a contrast is presented with northern Albania where there are large extents of alpine pastures.

Cultivation is limited to scattered patches of small maize fields in favorable situations such as the flat parts of the slopes and the bottoms of the first cycle of erosion.

## PEOPLE, SETTLEMENTS, AND TRAFFIC

My acquaintance with the people of Inner Albania was limited, and I shall therefore speak of them with reserve. Furthermore, my contact with them was in the region of the Shkumbi, the most accessible part of Inner Albania and the scene of a lively traffic during the war. Generally speaking, the people of Inner Albania as a whole are in bad repute as the wildest inhabitants of the peninsula and the most remote from the ordinary standards of European culture. They live scattered in tribes between which the blood feud is waged not infrequently. The popular accounts of the savageness of the people and of murders that form almost a part of the day's rou-

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<sup>9</sup> Antonio Baldacci: Die pflanzengeographische Karte von Mittel-Albanien und Epirus, *Petermanns Mitt.*, Vol. 43, 1897, pp. 163-170 and 179-183.

tine are in general exaggerations. A more correct appraisal of conditions in the interior of northern Albania has been given by sober observers well acquainted with the country, as for instance Baron Nopcsa, who has stressed the fine hospitality and other generous traits of the mountain people.

The chief business of the population of Inner Albania is sheep breeding. As far as soil conditions permit agriculture is carried on to supply the needs of the individual households, and mention should be made of a careful system of irrigation kept at great pains in a state of good repair. Irrigation ditches run for many kilometers along steep mountain slopes.



FIG. 28—The town of Krupa on the western border of Inner Albania.

The form of settlement, at least in the region I visited, is everywhere that of the widely scattered mountain village. The house type is the *kula*. In some few villages I observed houses better built and carefully whitewashed.

The town settlements of Inner Albania are found only on its extreme borders. Krupa is situated amid splendid scenery on the western precipice of the last chain of Inner Albania at an elevation of above 600 meters. Its pleasant, conspicuously white houses are for the most part surrounded by gardens, and the town presents many picturesque ruins from the times of Skanderbeg. Krupa is probably the most salubrious town of Albania and in the hot months of summer is a favorite resort of the rich.

The traffic of Inner Albania is confined almost exclusively to mule tracks. The only road at all passable for wheeled traffic is the Via Egnatia, already mentioned, which here uses for the most part the Shkumbi valley. It played

an important part in the late war, first as the line of Serbian retreat and second as a supply line for the Austrian forces. But it does not satisfy modern demands: the middle part, nearly 20 kilometers in length, which avoids the gorge of the Shkumbi is entirely unfinished. One quite frequently comes across remnants of roads begun by the Turkish government but never completed and useless even for local traffic, for the muleteers prefer shorter and more direct routes.

#### NOTES ON THE CLIMATE OF ALBANIA

Up till now very little data have been available as to the Albanian climate. Meteorological observations carried over any length of time were known only from Scutari. For the rest dependence was on isolated observations published by travelers. During the war systematic observations in numerous observatories were made by the Austrian meteorological service. Much valuable material was collected during a period of more than a year and a half. A part of this hitherto unpublished material has been put at my disposal by Dr. Maurer, the leader of the field meteorological service in Albania, and will be quoted here with some of my own observations.

Albania lies in the zone of subtropical climate and is throughout influenced by oceanic conditions, as it is open to the prevailing western sea winds. The chief characteristic of the climate is determined by the seasonal distribution of rainfall. There is a distinct period of autumn rainfall (mostly from the middle of October to January) and a period of summer drought (from June to September). The great intensity of the autumnal rains is a factor whose influence should not be underrated in considering in detail the evolution of the Albanian scenery. The origin of the "bad-lands" forms in the flysch is considerably favored by these powerful rains, and the gulleying and the landslides, especially characteristic of the Malakstra, are an immediate consequence of them. Military experience in the western Malakstra has shown how extraordinarily the conditions of the landscape can change in the course of a single season. With the coming of spring such change, for instance, necessitated a transference of the bulk of the communications as well as the trenches. These conditions partly explain the lack of beaten paths in the hill country of Lower Albania and the Malakstra, the climatic factor in conjunction with the unconsolidated nature of the rocks rendering it very difficult to keep the roads in good state. The mode of seasonal rainfall distribution is illustrated in Table I, averaging observations for the years 1917 and 1918 at Berat and Tirana.

The table shows that spring also is marked by numerous days of rainfall, but the amount is not considerable; the spring rains almost always have the character of sudden showers and are often associated with thunderstorms.

Kruxa, lying on the western slope of the Inner Albanian mountain region, shows a still more extreme rainfall régime. Here in October a monthly total of 218.9 millimeters was recorded, with a maximum of 40.2 millimeters on October 11; in January a total of 113.5 millimeters, with a maximum of

41.9; in February a total of 117.4 millimeters, with a maximum of 40.6; and in March a total of 125.3 millimeters. The rainy period here lasts throughout the winter in almost undiminished force till spring, obviously because the mountain barrier intercepts all the rainy squalls brought by the western and southern winds.

Of temperatures, only some extremes may be given. In Lower Albania temperatures below zero are rare in general, and the winter of 1917-1918 must be described as abnormally severe. Tirana showed five frosty days in

TABLE I—RAINFALL AT BERAT AND TIRANA, 1917 AND 1918  
(*In millimeters*)

MONTHS	TOTAL RAINFALL	MAXIMUM ON ANY DAY	DAYS WITH RAINFALL	REMARKS
June . . .	27.8	18.7	6	
July . . .	0.5	0.3	2	
Aug. . . .	17.3	17.3	1	1 thunderstorm
Sept. . . .	4.9	4.6	3	3 thunderstorms
Oct. . . .	122.9	27.1	15	10 thunderstorms
Nov. . . .	108.0	31.9	13	3 thunderstorms
Dec. . . .	123.1	33.6	17	2 thunderstorms
Jan. . . .	64.3	24.7	10	1 day with snow
Feb. . .	53.4	25.2	8	3 thunderstorms
March . .	66.5	23.0	13	4 thunderstorms
April . . .	73.3	19.7	16	7 thunderstorms

December and a minimum temperature of  $-1.3^{\circ}$  C.; January had seven frosty days and a minimum of  $-5.3^{\circ}$  C.; February, three frosty days and a minimum of  $-1.3^{\circ}$  C. The mean temperature of each of the three winter months was somewhat above  $7^{\circ}$  C. The winter of Berat with the minimum of  $-4^{\circ}$  C. and with six frosty days in January appeared little milder. Kruya, on the contrary, owing to its considerably greater height, has a more severe winter: here in December a minimum of  $-5^{\circ}$  C. was registered, and on two days the temperature did not rise above zero. Here, too, January shows the lowest temperature, with a minimum of  $-6.8^{\circ}$  C.

As has been stated, these data do not give a correct idea of a normal Albanian winter; they are those of an extremely severe one and are of interest to that extent.

The highest temperatures are probably reached in the months of July and August. Thus I have before me observations from Elbasan, which,

owing to its situation in an enclosed basin, is considered the hottest town of the country.

In July, 1917, the mean was  $25.86^{\circ}$  C. and the maximum  $36.8^{\circ}$  C.; in August of the same year the mean was  $26.75^{\circ}$  C., the maximum  $39.8^{\circ}$  C. This last temperature is an extreme probably seldom reached; altogether the summer of 1917 was considered very hot. In July, 1918, in the Shkumbi valley below Elbasan I measured about noon a maximum of  $36.2^{\circ}$  C. with a sling thermometer; and on several days running,  $32^{\circ}$  C.– $34^{\circ}$  C. This probably corresponds to the highest temperatures reached in summer. The great heat of summer is sultry and burdensome only in the more enclosed valleys and the plains of the interior, in the hill country and on the shore it is moderated by the cool sea breeze of the daytime.

The summer heat of Inner Albania is much more moderate. Kruya in the hot summer of 1917 only showed a maximum of  $33.6^{\circ}$  C. in August, with a mean in this month of  $23.3^{\circ}$  C. In August, 1918, which I passed for the most part in the Inner Albanian region of the Shkumbi, I did not feel the heat of summer disagreeable, in spite of the considerable effect of radiation in this region poor in vegetation, as the cooling influence of the sea breezes reaches even up to that point.